

# NASA TECH BRIEF



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## Preparing Rock Powder Specimens of Controlled Size Distribution

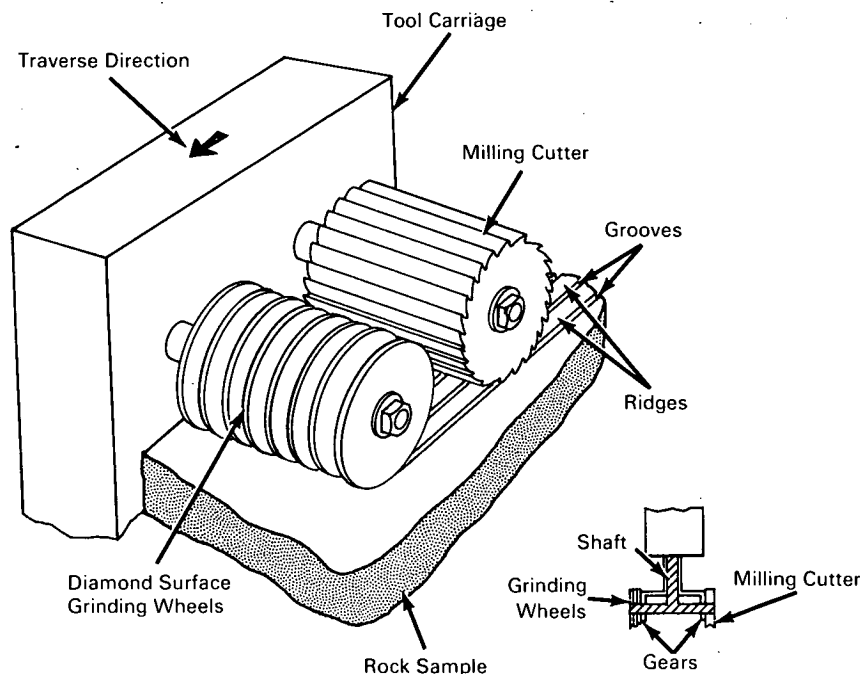


FIGURE 1

FIGURE 2

There is a need in geological sampling for an apparatus that will grind the surface of rock specimens or other brittle materials and give high yields in any desired particle size range without recourse to classification or sieving techniques. An important reason for avoiding these techniques is that they produce mineralogically unrepresentative powder specimens. Additionally, conventional grinding techniques do not provide adequate yields in coarse size ranges, for example, particle sizes between 75 and 150 microns, suitable for analysis by a petrographic microscope.

Conventional grinding of basalt, for example, tends to produce particles with sizes predominantly below 44 microns. Variation of conventional grinding parameters, such as wheel speed and grit size, does little to increase the yield of particles above this size or to change the shape of the size distribution curve.

A newly developed apparatus (Figure 1) produces rock powder specimens of the desired controlled size distribution. The apparatus accomplishes this by cutting grooves in the surface of the rock sample to provide thin, shallow, parallel ridges which are then

(continued overleaf)

milled to produce the powder specimen. Control of the particle size distribution is effected, primarily, by changing the height and width of the ridges.

The new apparatus includes a group of thin parallel diamond grinding wheels and a milling cutter. The grinding wheels and milling cutter are driven by a motor (not shown) mounted in the carriage which is advanced in the indicated direction over the rock sample. The wheels cut closely spaced parallel grooves, thus forming a set of parallel ridges on the surface of the sample. The milling cutter shaves the ridges down partially to produce a controllable yield in terms of particle size. Only the milled powder is collected in a cup (not shown) mounted on the apparatus.

A variation of the apparatus designed as a rock drill for taking a sample in a predrilled hole is shown in Figure 2. Diamond grinding wheels and a milling cutter are mounted on a common shaft. The grinding and

milling tools are driven to traverse the same rotary path on the rock surface within the hole. These tools are individually rotated by gears.

**Note:**

This apparatus should be of interest to petrographic testing laboratories and the manufacturers of rock-sampling equipment.

**Patent status:**

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457 (f)], to the Norton Research Corporation, 70 Memorial Drive, Cambridge, Massachusetts 02142.

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